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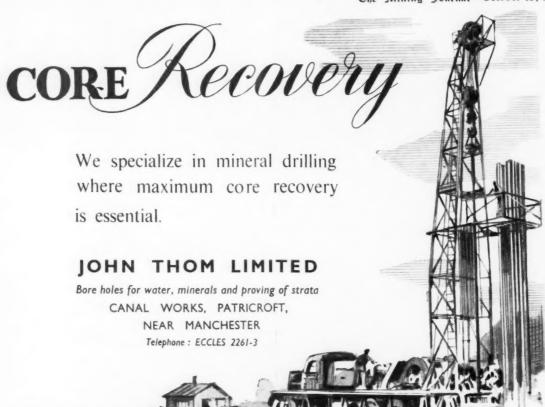


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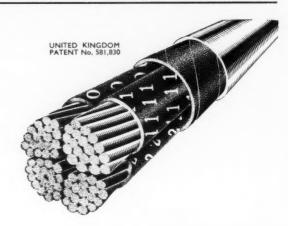


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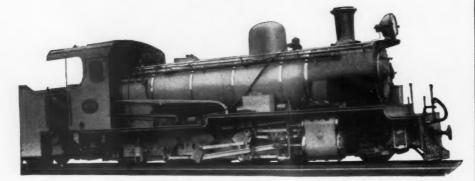




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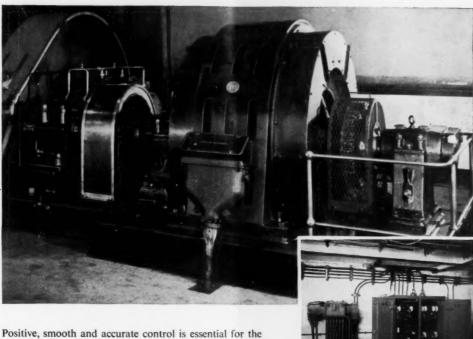
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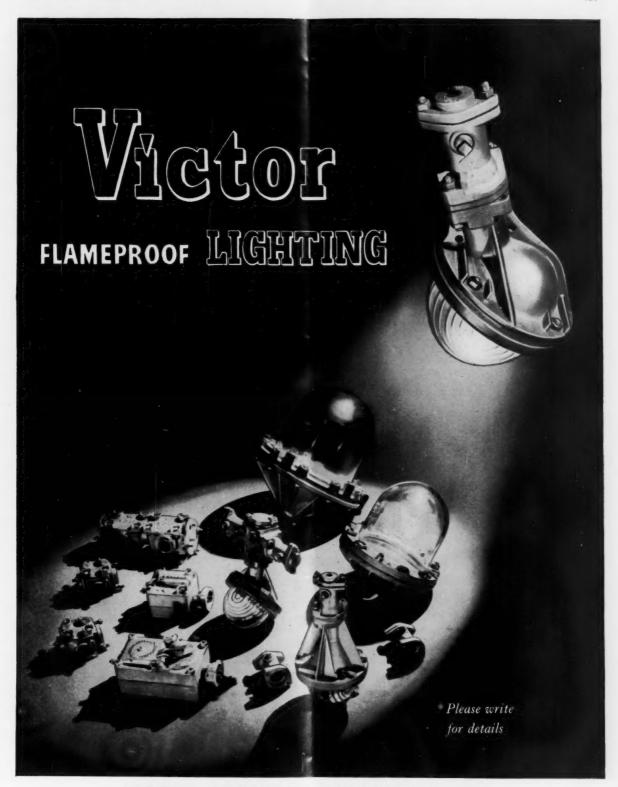
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# The Mining Journal Established 1835

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*	CONT	ENTS		
Notes and Comments  From Our Coal Correspondent  Versatile Drilling Combination Simplifies Mining  Practice along the Golden Mile	419 421 422	Machinery and Equipment Metals, Minerals and Alloys The Mining Markets Company News and Views Company Meetings and Announ		
Heavy Load Mine Hoist for Opencast Operations at Kiruna, Sweden Selenium—Recent Metallurgical Practice and Production	425 426	Central Mining—Rand Mines ( Gold Mining Company Limite (London) Limited	Group; Bly	

### NOTES AND COMMENTS

# Pillar Extraction by Machine Now Acceptable in New South Wales Coalfield

What is probably the most momentous happening in the coal mining industry of New South Wales, was the sudden withdrawal by the Miners' Federation of its bitter opposition to the working of pillar coal by machines, according to our Australian correspondent.

The sudden change of front seems to be due to a belated realization that the opposition over the past 25 years had reached a stage at which their industry and their jobs were in danger. Under the new award by the Coal Tribunal every mine worker will share in the benefits arising from mechanical working of pillars, attendance allowances are to be increased all round, at mines where machines are not used, an extra 15s. per fortnight will be paid, and at mines where machines are used, this will be increased to 40s. per fortnight. Heavy expenditure will be involved in the purchase and installation of the new machines, and in the preparation of underground workings for the new development. In anticipation of higher production, haulage systems must be altered to deal with the increased transport. It is thus apparent that new mining techniques will be put into practice in the area, and that manufacturers of mining machinery may look forward to expanded markets. It is considered that costs can now be reduced, and in some cases the reduction will be marked. By means of the revised policy it is hoped to recapture lost internal and export trade and to place the coal mining industry in a position to compete on better terms with oil.

The effect of the change can be appreciated from the fact that in the New South Wales collieries, some 240,000,000 tons of high grade gas and steam coal have been locked up in pillars, through the miners' opposition to the use of machines for the utterly untenable reason that the use of machines is dangerous practice. In the northern field, the Greta seam of high grade gas coal is 20 ft. to 26 ft. thick, and many collieries work seams from 6 ft. upwards in thickness. It will now be possible to work collieries in a proper manner, with pillar extraction following the first working, and the heavy expense of maintenance of great pillar areas will gradually be decreased until a normal condition of operation is attained.

Under mining regulations, pillar area varies with the depth of cover, and reaches a maximum of some 75 per cent of the seam, so that first working, involving some 25 per cent of the total coal, must carry the whole burden of capitalization, while the productive capacity of the colliery is drastically reduced. This strenuous opposition to mechanical extraction of pillars was the last ditch in a prolonged fight against mechanization in any form, a fight in which the colliery owners have progressed slowly but surely.

#### South Africa's Water Problem

An article published in *The Mining Journal* last year (August 7, 1953, pp. 164-166) drew attention to South Africa's critical dependence on the Vaal River for the additional water required for future mining and industrial expansion in the Southern Transvaal and Northern Orange Free State. The opinion was expressed that, in the long run, shortage of water seemed likely to place an upper limit on industrial development in the Vaal River basin.

The Rand Water Board has calculated that the maximum assured flow of the Vaal is 800,000,000 gallons per day if the Vaaldam is raised 20 ft. and if storage equal to the existing Vaaldam is, in addition, provided between Vereeniging and Kimberley. Our contributor pointed out, however, that much of the water drawn off for urban and industrial purposes would be returned and re-used.

The Vaal River, it was stated in the article, is already committed to meet 565,000,000 gallons of major requirements, including an estimated 30,000,000 gallons for the gold mines of the Orange Free State and Far West Rand, as well as a minimum of 200,000,000 gallons for irrigation. Yet the Vaal-Hartz irrigation scheme alone is designed to abstract a maximum of 540,000,000 gallons. In attempting to assess the future outlook, the conclusion was therefore drawn that much would depend on the highly political issue of the relative priorities to be accorded to agriculture and industry in the allocation of supplies.

Despite reassuring statements to the contrary, it is evident that the future requirements of mines and industries can only be assured by a long-term policy based on expansion of storage capacity and a realistic allocation of abstraction rights. The urgency of the situation is evidently appreciated by the South African Government, whose Water Laws Amendment Bill seeks to consolidate and amend the various laws relating to the conservation, control and use of water.

Expressing the hope that this Bill would be enacted during the next Parliamentary Session, the Minister of Lands stated that with proper control, supplemented by certain "physical measures," the Vaal would have the capacity to continue supplying Witwatersrand industry till A.D. 2000. According to our Johannesburg correspondent, the Vaal and Hartz rivers can supply an estimated flow of 785,000,000 gallons a day against 991,000,000 gallons required. Of the shortfall, sewage purification is expected to yield about 128,000,000 gallons, while 78,000,000 gallons might be made available to the Orange Free State from the Caledon River, subject to agreement with the British authorities in Basutoland. Other proposed measures include control over the whole of the Vaal and Hartz rivers, further raising of the Vaaldam wall, raising the wall of the Vaal-Hartz dam, one or more conservation dams on the Vaal River between Parys and Bloemhof, and another on the Hartz River.

The Minister's estimates are in general agreement with the figures given by our contributor, assuming that the 991,000,000 gallons required by A.D. 2000 provide for the maximum offtake of 540,000,000 gallons for the Vaal-Hartz irrigation scheme. We might point out, however, that South African rivers are notoriously variable. In fact, we have been personally informed by an ex-farmer from Fouriesburg, whose property was bounded by the Caledon, that within his experience this river twice stopped flowing during a period of severe drought. Presumably this factor has been allowed for in the Government's calculations.

The sting of the Minister's statement lies in his concluding observation that eventually industry in general will have to move to the water east of the Drakensberg mountains. This, coupled with the fact that the pending legislation has been announced by the Minister of Lands, indicates only too clearly the Government's intention that, when there is no longer enough water to go round, it is not the farmers who will have to trek.

# New Recovery Process May Enlarge Markets For Thorium and Rare Earth Metals

A new process for the recovery of thorium and the rare earth metals from monazite sand has been developed by scientists at Battelle Institute in a research project sponsored by the U.S. Atomic Energy Commission. The process is simpler than present processes and may be a factor in the development of new markets for these metals.

Monazite sand is one of the most important sources for thorium and the rare earths. The best known deposits of monazite are the beach sands of Brazil and India, but there is some monazite in Florida and Idaho and in other parts of the United States. The search for better methods of recovering thorium and the rare earths from their ores has been stimulated over the past ten years by the possibilities of sizeable new markets in the atomic energy, metal, and electrical industries.

Thorium metal is of interest in connection with nuclear breeder reactors, while thoria, the oxide of thorium, already has an established use in the making of tungsten-lamp filament wire and as a refractory material. The rare earths are known to most in the form of misch metal. Chemically, monazite sand contains principally phosphates of the rare earths and thorium. The sand is up-graded by ore-dressing methods to produce the concentrates, which are processed chemically. The conventional process, used by the rare earth industry in the United States, satisfactorily

breaks down the monazite sand through treatment first with sulphuric acid and then with water. However, the resulting solution contains nearly all the phosphate in the sand, and the presence of this phosphate seriously complicates the recovery of thorium and the rare earths.

As described initially before the International Congress on Nuclear Engineering held this summer in the United States, the new process treats the monazite sand first with sodium hydroxide and then with hydroxhloric acid. These recovery agents permit removal, at an early stage, of the phosphate present in the sand. Thus, subsequent separation and purification of thorium and the rare earths is greatly simplified. The new process has been carried out on a small pilot-plant scale, and certain operations are essential.

The reaction of the monazite sand with a hot concentrated aqueous solution of sodium hydroxide must take place, thereby converting the metal phosphates of the sand to hydrous metal oxides and trisodium phosphate. The hydrous metal oxides are separated from the dissolved sodium phosphate and excess sodium hydroxide and the hydrous metal oxides must be dissolved in hydrochloric acid. There follows the precipitation of a thorium product by partial neutralization of the acid solution and the precipitation of a high-grade rare earth hydroxide product by further neutralization of the chloride solution.

#### Taxation and the Rhodesian Smallworker

In his presidential statement to the annual meeting of the Rhodesian Mining Federation, held in Salisbury on September 14, Mr. C. L. de Beer said that Rhodesian smallworkers, and many of the medium-size producers, were at their "wit's end" to break even, let alone pay a dividend and cover depreciation costs. "I wonder," he asked, "if the powers-to-be have been looking at this problem so long that they cannot see." In the past three years as president he had suffered every form of disillusionment possible. One had hoped that assistance would come to the industry by an increase in the price of gold, but that hope had gradually faded. The industry, said Mr. de Beer, played a big part in the economy of Southern Rhodesia, and that should indicate that no stone should be left unturned to foster such an asset, writes our Rhodesian correspondent.

Southern Rhodesia's Minister of Mines, Mr. Davenport, told the meeting that it seemed "perfectly obvious" that mining must become a Federal matter before very long. He pointed out that transport, electricity and taxation were the three main issues affecting mining, and they were all Federal subjects. Southern Rhodesia finance was tight at the moment, he said, and the Government had to conserve its resources. He had hoped that some assistance might have been provided for the mining industry, even as a subsidy, but it seemed to be quite impossible.

The Acting Governor of Southern Rhodesia, Sir Robert Tredgold, who opened the meeting, said he knew the smallworkers were going through a bad patch, "but I hope you will discover some alternative to getting Government assistance other than a subsidy." He said he realized the importance of the industry and that at the moment it was in need of all the assistance the Government could give. He said he had no doubt that—although the industry had already waited nearly to the stage of desperation—costs would in the near future drop to some extent.

Among resolutions passed at the meeting was one asking the Federal Government to take urgent steps to prevent the collapse of the gold mining industry of Southern Rhodesia. The meeting also called upon the Southern Rhodesia Government to make every effort to rehabilitate the mining industry by locating new mines by modern, scientific methods.

# The Coal Industry

(From Our Coal Correspondent)

While total U.K. coal output so far this year shows an increase on last year's figure, home consumption is rising at a still faster rate and growing concern is felt about the running down of stocks. More coal has been imported than in the comparable period of 1953, tonnages being 1,250,000 tons and 250,000 tons respectively.

In an endeavour to avoid a threatened shortage of household coal this winter coal has been imported from Europe and the U.S.A. The 9,500 tons of American coal which arrived in Britain in August was the first shipment from the U.S. since the winter of 1951-1952 and several more shipments are due in the coming months. Under a new contract with the National Coal Board, Belgium will export 960,000 tons of coal to Britain this year. This will be sold by the Belgian collieries at reduced prices in order to stimulate sales and so help diminish the large stocks currently held in Belgium where rapid accumulation of coal stocks has given rise to some unemployment in the mining industry. The situation has caused the Belgian Government to introduce coal import restrictions. The position of Belgium's coal mining industry is due in part to high prices and at present the collieries have 4,000,000 tons of unsold coal in stock.

An additonal 100,000 tons of coal is to be imported into Britain from Poland during the year ending April 30, 1955, and France and Western Germany have also contracted to supply coal to the U.K. As pit-head prices in Western Europe are appreciably above the price in Britain and the policy of the N.C.B. is to sell imported coal at prevailing internal prices, importing coal into Britain results in considerable financial loss to the Board. This loss amounted to £1,010,000 in the first six months of the current year. Despite this loss, a profit of almost £500,000 was made by the N.C.B. during this period, after making provision for interest and taxation, etc. The average pit-head price of coal in Britain at the moment is rather more than £3 per ton; this comparing very favourably with an average pit-head price in Western Europe of almost £5 per ton.

With the current f.o.b. price of coal from the East Coast of the United States ranging from \$7.50 to \$10 per ton assuming freight costs to remain at the 1953 level of \$4 - \$6, the cost of U.S. coal delivered to Europe is as cheap as exported British coal.

#### JAPAN STUDIES INTERNATIONAL MARKET

From Japan comes news of the decision of the Japanese Government to set up a permanent delegation to the sixnation European Coal and Steel Community which has its headquarters in Luxembourg. This action has been taken in order that Japan may study at close quarters the High Authorities' investment and price policies and other technical interests. Japan has also announced the signing of a contract with visiting Soviet trade representatives for the import from the U.S.S.R. of 60,000 tons of coal. This is the first formal contract to result from the provisional barter agreement signed earlier this year between five Japanese firms and the local Soviet Trade Mission. Coal output in Russia is increasing rapidly and at a current annual output of some 320,000,000 tons is almost twice as much as was mined in 1940.

In an endeavour to ease the unemployment problem now prevailing in the U.S. coal mining industry, plans are being made to ship 10,000,000 tons of American gift coal to friendly countries during the fiscal year ending June 30, 1955. This coal will be additional to that now being pur-

chased abroad with free dollars. By this move not only will surplus coal be disposed of but industrial activity in the recipient countries will be stimulated and subsequent new markets for U.S. coal created.

#### LIQUID FUELS THREATEN U.S. COAL INDUSTRY

The growing threat to the U.S. coal mining industry offered by the increasing use of non-solid fuels was spotlighted by the National Coal Association who in analysing a recent Federal Power Commission statistical bulletin, pointed out that the import of 134,000,000 bbl. of oil in 1953 was equivalent to 34,000,000 tons of coal. Imports of foreign residual oil into the U.S. have now increased to 400,000 bbl. per day and together with indigenous fluid fuels and natural gas now account for a substantial part of the fuel required for power generation. Widespread use of non-solid fuels for power generation is not common practice in coal producing countries but is more usually confined to countries which require to import coal; notable examples being the Scandinavian countries. Here the major reasons for the change to fuel oils have been the greater certainty of supplies and the relative cheapness of transport. Indeed, shipping is the only sphere where a universal preference for oil has been shown. So rapid has been the change over from coal to oil it is estimated that within ten years, if the steady trend of the last 30 years continues, the world's merchant fleet will be almost wholly oil burning.

A plan to assist the United States' coal industry by forming a non-profit making export company is being considered by the United Mine Workers' Union, according to a newspaper report. This company to be jointly financed by the union and the mine owners would lease Liberty Ships now held in "mothball" storage to carry coal to foreign markets. It is stated that by this means, present foreign sales of 10,000,000 tons per annum could be increased to 50,000,000 tons a year.

#### ROLE OF COAL IN THE ATOMIC AGE

Both from the U.S. and Europe come reports which will allay the fears of those to whom the onset of atomic power spells widespread disruption of the world's coal mining industries. In America the Atomic Energy Commission told Congress that the rapidly expanding markets for fuels for electricity generation and other purposes, together with the time required for nuclear power development were sufficient reasons for concluding that competing fuelsparticularly coal-would still be required in quantity for some considerable time to come. The A.E.C. report concluded that the contribution that nuclear power can be reasonably expected to make towards total requirements for electric power by 1975 would do no more than moderate the already rapidly rising demand for conventional fuels. Staff studies suggest that the share of atomic energy in total energy production may be from 2-10 per cent by 1975, but such estimates can of course prove wide of the mark.

A recent report published by the United Nations Economic Commission for Europe states that as energy requirements in Europe will steadily increase during the next ten years—from the 660,000,000 tons coal equivalent in 1953 to 750,000,000 tons in 1963—and as atomic energy is unlikely to have any major effect in this time, it is necessary to utilize all supplies of available energy in the most rational manner possible. In Britain the National Coal Board has for some time been concerned with the problem of fuel efficiency both in industry and in the home and at present subscribes £250,000 per annum to the National Industrial Fuel Efficiency Service set up by the British Productivity Council.

# Versatile Drilling Combination Simplifies Mining Practice Along the Golden Mile

By H. F. C. NEVILL

On the Kalgoorlie goldfield, Western Australia, which has produced 30,000,000 oz. of gold since 1893 and is still producing 500,000 oz. per year, post-war rises in wages and prices of materials were causing such steady increases in production costs that the latter were close approaching the static price of gold. Post-war technical progress in mining methods and the manufacture of materials has resulted in more economical production with a subsequently more attractive economic position, one of the most important of the contributing factors being the wholesale adoption throughout the Golden Mile of tungsten carbide tipped integral drill steel and light jackhammers usually supported by air legs or rising feeds. The following article was prepared for The Mining Journal by the author, the Senior Lecturer in Mining Engineering, University of Melbourne, who visited the Western Australian goldfields during February, 1954, and with the co-operation of the mining companies operating in the area, which is hereby acknowledged, inspected the individual properties. The suitability of a light jackhammer unit with tungsten carbide tipped integral drill steel for the conditions existing at Kalgoorlie was demonstrated by representatives of Atlas Diesel Ltd., and before the end of 1951 all mines on the field had converted to the new system of drilling.

On the Golden Mile field of Western Australia, orebodies usually consist of complicated systems of shears in quartz dolorite greenstones. Quartz veins occur in some places but not to any notable extent. Some orebodies also occur in a calc schist or older greenstone and penetrating

porphyry or in slates associated with porphyry. Except in upper levels where ground is softer, these rocks give medium hard to hard and tough drilling conditions in which a normal forged steel bit lasts  $2\frac{1}{2}$  to  $3\frac{1}{2}$  ft. The usual machines for drilling in development ends and stopes were 3 in. drifters mounted on a  $3\frac{1}{2}$  in. dia. bar,  $2\frac{7}{8}$  in. and  $3\frac{1}{8}$  in. stopers and 3 in. sinkers.

Since 1939 light jackhammers and air legs with straight carbon steels were used in softer ground but were not effective until the advent of tungsten carbide tipped steel during 1950. About this time a number of different brands were introduced: Holman

brought in Avesta integral drill steel, detachable Holbits and air legs, Seco and SKF integral types were imported from Sweden, Ingersoll-Rand brought out the Car-set carbide tipped detachable bit and a number of other detachable bits of this type became available. Atlas-Diesel, as well as producing Coromant integral carbide tipped drill steel for use on any type of machine, redesigned their light jackhammer to give a lighter but faster blow and introduced a combination of light hand held machine, airpusher and rising feed designed to make one machine of universal application. Also this company sent over to Kalgoorlie in late 1950 a team of technical representatives who were able to demonstrate the special techniques for obtaining the most economical results, and advise the mines about unusual conditions. This new approach was decidedly helpful in obtaining quick conclusions, and after thorough tests were made with the new types of equipment it became obvious that a light jackhammer combination unit with tipped steel was more suitable for Kalgoorlie conditions than a bar rigged drifter. Before the end of 1951 all the mines on the field had converted to the new

Now, after two years' operation, a visit has been made

to assess the impact of this new drilling combination on Kalgoorlie practice. At the same time some data was collected from Central Norseman Gold Corporation, 130 miles to the south, for comparison, since at this mine the greater part of the drilling is in hard abrasive vein quartz.

Both in stopes and drives the jackhammer air-pusher rig proved its superiority not by penetrating the rock much faster but by drilling the same number of holes in a very much shorter time. In other words, speed of handling reduced unproductive time to such an extent that many machines were doing twice as much work in a shift as they did previously. Details of present practices and results at the different mines are given in the table on page 424 which shows the marked increases in efficiencies at all

Part of the increased efficiency is due, of course, to the carbide tipped steel being able to drill a hole with a



Atlas Diesel 656-4W rock drills in operation at Great Boulder Pty. Gold Mines Ltd.

able to drill smaller average diameter as shown below:

For a 7 ft. hole	Carbide tipped series 1 on \( \frac{1}{8} \) in. alloy rods	Forged crossbits on 1 in. plain carbon rods	
Hole dia. at start ,, ,, bottom Hole area at start ,, ,, bottom Average vol. for 7 ft.	34 mm. or 111/32 in. 32 mm. or 1½ in. 1.42 sq. in. 1.23 sq. in. 111 cu. in.	1% in. 1% in. 2.76 sq. in. 1.35 sq. in. 173 cu. in.	

A further part of the increased efficiency is due to the fact that the same machine can be used to drill down holes or flat holes in stopes or development and can be very quickly rigged to a rising feed to drill up holes when required.

Performance of different varieties of drill steel appears to vary slightly in different mines and the range of average life given in the final table shows the variation in hardness and abrasiveness of rock drilled. Gold Mines of Kalgoorlie, Boulder Perseverance, Great Boulder, North Kalgurli and South Kalgurli use for the main part No. 1 series Coromant carbide tipped integral steel in lengths of 2 ft. 3 in., 5 ft. 7 in., 7 ft. 10 in. Central Norseman use series IV Coromant steel with a starting gauge of 40 mm. to allow

for the much greater abrasiveness of vein quartz.

Lake View and Star do most drilling with Seco steel and use some SKF and Coromant. For holes longer than 7 ft. and up to about 15 ft. drill steel with 40 mm. starter inserts are used instead of the normal 34 mm. starter.

It must be emphasized here that all mines keep accurate records of drill steel life and are constantly testing new brands for the purpose of maintaining drilling cost at the lowest possible point. With the large footage drilled annually fractions of a penny per foot drilled are important.

Sectional steel has not been used extensively on the Kalgoorlie field except for special work such as extra long sample holes and pillar reclamation; at Gold Mines of Kalgoorlie it was used successfully to remove a pillar in Australia East open cut. Equipment used was one Atlas RH656-1W with normal series IV Coromant steel to drill holes up to 10 ft. deep and one RH657-2W to complete the holes with  $\frac{7}{8}$  in. hexagon extension steel and Coromant detachable bits of 35 mm. gauge. This work entailed 3,800 ft. of drilling, some of it from platforms in a rise. Throughout, the new machines gave 50 ft. per machine shift and 43 ft. per man shift since two men per machine were required on long up holes. To reduce couplings in a string of rods to the lowest number all development openings were slashed to 11 ft. wide and 13 ft. 6 in. extension rods were used wherever possible. Total cost of mining this pillar compared favourably with normal practice in the open cut and was better than could have been expected with long diamond drill holes in this type of broken ground.

#### USE OF FLEXIBLE STEEL

Coromant flexible flat bar steel is used generally throughout Kalgoorlie for drilling long sample holes from confined spaces. It has a carbide tipped chisel bit with a water hole on the side but the rectangular section of ½ in. by 1 in. allows the steel to be sprung fairly easily. At Great Boulder the "ribbon steel," as it is called, is more successful than light extension steel equipment for drilling level



Drilling a vertical hole with Atlas 656-4W unit and short pusher leg at Gold Mines of Kalgoorlie



Use of flexible drill steel with the Atlas Diesel machine at Great Boulder Pty. Gold Mines

pillars in hard ground. Holes 18 ft. long are drilled from chambers 8 ft. wide and the main advantages are:

(a) Footage drilled per shift amounts to 130 ft. instead of

70 ft. with extension steel;
The same number of steel is required as for short hole drilling instead of a double set of extension equipment which is needed to allow for breakages of bits, couplings

Carbide tipped detachable bits for general drilling have not proved successful at Kalgoorlie; many types have been tried and more are being tested but the only mine using them at all is Great Boulder. The average bit life at this mine is 500 ft. while the stem has a life of 800 ft.

#### LIGHT RIG MACHINES

When the new system was introduced in 1950, changing over entailed discarding a large number of machines complete with bar gear, spares, drill steel and some steel sharpeners, but advantages were sufficiently apparent to make this worthwhile. Lake View and Star's changeover is typical of results obtained by a majority of Kalgoorlie mines. In 1950 this mine had 262 machines of nine different types; 212 of these were in daily service drilling an annual total of 2,080,000 ft. When the change to the light rig took place it was possible to reduce machines to 249 with only 172 in service while drilled footage actually rose to 2,470,000 ft., equivalent to an increase from 9,800 ft. to 14,360 ft. per machine per annum. At Gold Mines of Kalgoorlie some machines have drilled 60,000 to 80,000 ft. since 1951.

The versatility of the light jackhammer, which is used for down holes when hand held, flat holes when mounted on an airleg or up holes when mounted on a rising feed, has reduced the number of idle machines underground and made it possible to standardize to a large extent on one machine. The present usage at Lake View and Star consists of 12 Ingersoll Rand X59 84 lb. jackhammers for shaft sinking work; 21 Holman S.L. 200 for timberman's machines; and 139 Atlas RH656 for driving, rising, leading stopes and stope breaking generally. The light jackhammer weighing under 50 lb. has not proved an unqualified success for down holes when hand held.

Standardization has reduced the number of rock drill spares carried on the mines and has been a major factor in reducing machine maintenance costs until three men and a foreman can now repair 14 to 15 machines a day.

#### DRILL SHARPENING PRACTICE

Sharpening practice on the field varies more than any other part of the new system.

South Kalgurli sharpens steel underground with Sandvik grinders located at stores on different plats. Steel is left by the miners at each plat and the steel sharpener travels



An Atlas Diesel 656-4W drilling a side hole in a drift at Gold Mines of Kalgoorlie

from one to the other. Sufficient steel is in circulation to allow replacement to be made when required before the mine uses the set again.

At Central Norseman, which consists of two different areas five miles apart, both underground and surface sharpening are practised. In the mine only a small amount of waste development is in greenstone and compared with the ore vein this rock is tough and slow to drill though it does not produce much gauge loss. The quartz vein, though it drills more rapidly, gives a very high gauge loss-1 mm. for every 14 to 15 ft. drilled-and this factor usually determines the life of the steel. Average life is only 227 ft. in spite of starting with a 40 mm. gauge. High gauge loss makes it necessary to use off-hand or free-hand grinding on a pedestal grinder so that bits can be sharpened to a smaller radius as required. At the same time the edge angle can be altered freely; the angles preferred are 100 deg. for greenstone and 105 deg. for quartz.

On all other mines due to a large number of working levels at each shaft it is better to have one or two sharpening shops on surface.

At Great Boulder sharpening free-hand on ordinary electric pedestal grinders is preferred because this method has proved cheaper and more flexible than jig grinding, and gives an average life for drill steel of just over 500 ft.

Gold Mines of Kalgoorlie use Sandvik pneumatic grinders in which steel is clamped and a rotating 5 in. cup wheel swung in an arc of about 80 mm. over the bit edge. This produces a bit of standard angle and curvature which gives a very satisfactory life of 522 ft. in the relatively soft calc schists that make up the larger part of the drilling.

Lake View and Star, Boulder Perseverance and North Kalgurli use the SKF Rockmaster pneumatic machines which have an 8 in. cup wheel moving across the underside of a steel held in a horizontal position. This also sharpens a bit to predetermined curvature and angle.

One point that is of particular interest in sharpening is the smaller shop required. Number of steel sharpened has fallen to about one-sixth of that handled previously; in the case of Central Norseman where hard quartz is the main rock the number is approximately one-tenth. Most of the mines have been able to re-arrange their shops; Lake View and Star, for instance, now have nearly two-thirds of their sharpening shop set aside as a store.

#### RESULTING EFFICIENCIES

Sharpening costs have generally been reduced to about one-third to one-quarter of forged steel costs but as the cost of new steel has risen by a corresponding amount these two factors largely cancel each other. Due to rises in wages during the change over period sharpening costs for forged steel would have risen considerably and thus carbide tipped steel can be credited with a gain here.

All ore breaking and developing operations have been favourably affected by the change in drilling methods. The most important figures are grouped in the following table. This shows the universal feature of the improvements, but the table cannot be used in any way for comparison between the different mines since there are marked differences in rock hardness and many other differences in practice, particularly in the manner of collecting efficiency data.

#### IMPROVEMENT IN DRILLING PERFORMANCE

	Kalgoo	orlie Mir	Norseman			
	of Kal-	Boulder Perse- verance	Great Boul- der	Lake View and Star	North Kal- gurli	Central Norse- man
Feet drilled per						
sharpening—	2.0	2.5	2.2	2.0	2.0	
1951	3.0	2.5	3.3	3.0	3.0	1.4
1953	40.0	16.0	20.0	27.0	30.0	
Total life of car- bide tipped steel in ft. for 1953	522	ries from 2 in soft lgoorlie	er calc	schists.	Average	
Percentage incre	ase (+)	or decre	ease (—)	from 1	950/51 t	o 1953
Tons treated per annum	+6.5	+18	+22	+15	+11	+5
No. of machines in use	—31	-30	-31	19	30	
No. of steel sharpened per day	—91	83	—83	83	-75	<u>90</u>
Cost of drilling per foot	-17	—30	-22 ·	5 —8	—5	-30
Feet drilled per machine shift	+111	+71	+83	+51	+50	
Feet development advance per machine shift	+20	+27	+33	+36	+20	+29
Tons broken in stopes per machine shift	+69	+92*	+63	+40	+25†	+22

<sup>\*</sup> Tons broken per machine man shift. † In 1951 North Kalgurli (1912) Ltd. 20% of stoping parties were using light drilling equipment with carbide tipped steel

SWEDISH HOISTS-II

# Heavy Load Mine Hoist for Opencast Operations at Kiruna, Sweden

The necessity to raise particularly heavy loads promoted the special design of mine hoist which was put into operation at the Kiruna, Sweden, opencast iron ore mine in July, 1951. This hoist was manufactured by Allmanna Svenska Electriska Aktiebolaget (ASEA), and differs from more standard hoisting equipment in many respects, notably that it was specifically constructed to raise large tomages at a slow speed over a short distance and that an extreme degree of automatic control ensures that a minimum of operating personnel are required, while in addition, electrical interlocks make faulty operation virtually impossible. The following article by F. Landau, industrial engineering department, mining and industrial transport section ASEA, appeared in ASEA Journal, Vol. 27, and describes the construction and pushbutton operation of this hoist. The article concludes a series of two dealing with ASEA mine hoist constructions of which the first instalment appeared in The Mining Journal of October 8, 1954.

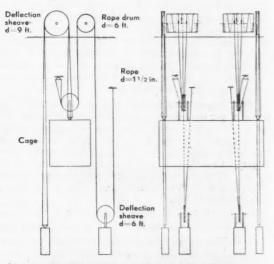
The purpose of the Kiruna hoist is the transportation of rock spoil from the open pit workings so that access to the ore body is provided. Mechanical excavators are used to load the rock into railway trucks which subsequently are raised by the hoist to an outlet tunnel through the mountain. The markedly heavy loads which obviously arise from this method of operation are the reason for the special design of the A.S.E.A. hoist.

#### THE CAGE LOAD

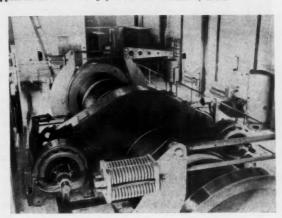
The cage itself weighs 37 tons and carries a railway truck weighing 33 tons, loaded with 50 tons of rock. The attached ropes thus support a total weight of 120 tons, partially balanced by counter weights totalling 82 tons. The relatively short hoisting distance does not exceed 230 ft. and the hoisting speed is low at 1.6 f.p.s.

The hoisting drum is divided into two halves, each drawing three ropes. Two of these are hoisting ropes which are fixed in the shaft after passing over a double-groove deflection sheave fitted to the top of the cage. The third rope passes from the drum to a sheave in a counter-weight and thence to a fixed point in the shaft.

There are thus two counter-weights to balance the weight of the car and a large portion of the net load weight. In addition, there are two counter-weights which balance only the weight of the car. Each of these counter-weights is supported by double ropes which pass to the cage over double-groove deflection sheaves separately borne at the end of each drum.



An elementary drawing of the hoist equipment



The interior of the hoist room

By distributing the weight of the cage, car and load on 12 ropes, the diameter of the drums and deflection sheaves has been reduced to 6 ft. Only the double-groove sheaves in the base frame of the hoisting unit have a dia. of 9 ft. This is necessary because of the centre-to-centre distance between the cage and the counter-weight.

#### THE HOIST UNIT

The hoist unit is driven by two D.C. motors connected in series and each rated at 150 h.p., fed by a Leonard converter. Transmission is through a precision gearing fitted between the two drum halves, which are connected to the two slow-speed shafts by toothed couplings. All bearings in the gears and hoist are S.K.F. roller bearings.

A drum brake is provided for each half of the hoist unit and, in the event of an emergency stop, these drum brakes are applied by a falling weight combined with a spring. Two compressed air operated and spring loaded block brakes are utilized as operating brakes, which work on brake drums fitted to extensions of the gearing primary shafts. As all speed regulation is electrical, these operating brakes serve only to hold the drum unit after normal arrestation has been accomplished. The hoist is normally controlled by means of pushbuttons in the shaft but it can also be manually operated from the control board.

When hoisting rock, the hoist is operated by means of pushbuttons in the shaft, and at all levels the cage rests on keps built into its lower structure. This constructional design is necessary to ensure that the cage does not sink when the ropes give on taking the load strain, a factor which might result in the rear wheels of the loaded truck dropping onto the rails in the cage and causing severe mechanical shock.



The hoist cage containing a railway truck loaded with 50 tons of rock

When the cage approaches its destination, it stops at a point somewhat above the level and the keps are automatically extended into openings in the shaft wall. In the subsequent operation, the cage is automatically lowered at creeping speed until the two keps are firmly at rest. The cage

and shaft gates are then automatically lifted and the rail checks in the cage lowered, though only at the entrance of the cage. In addition to the rail checks and cage and shaft gates, the keps are operated hydraulically. For this purpose oil at high pressure is used, being supplied by a continuously operating I.M.O. pump and controlled by magnetically operated valves.

#### HOISTING MEN AND MATERIALS

After a starting impulse has been given to the hoist, the cage and shaft gates close and the rail checks in the cage are raised. Simultaneously, the cage is lifted a fraction to enable the keps to be withdrawn in an automatic movement. The hoist will only start again after the termination of this operation, and only if the rail checks in the shaft have been raised to arrest the following car. A mine locomotive is used to push the trucks into the cage and for the reverse procedure. When hoisting men, the hoist can carry a personnel quota of 160, and in this operation the cage is called to the level by pushbuttons in the shaft and afterwards is sent to its destination by pushbuttons in the cage.

The outlet tunnel for the railway trucks is at a depth of 525 ft., and in addition there now are levels at 575 ft. and 625 ft. depth. Future transportation will take place from a maximum depth of 750 ft.

Normally the problem of transportation presented by the particular conditions existing at Kiruna would have presented marked difficulties, but the extreme degree of automatic control achieved has produced simplified operation requiring a minimum of personnel. The electrical interlocks make faulty operation impossible.

# Selenium—Recent Metallurgical Practice and Production

Selenium is finding a wider application owing to the more developed chemical and industrial processes which have followed the Second World War, and more selenium is consumed by pigment and rubber producers than by the glass and steel industries despite the fact that the only commercial source at the present time is the anode mud or slime produced in the electrolytic refining of blister copper. The following article briefly outlines the properties and general uses of selenium, and thereafter describes the more effective recovery methods used in the United States and Canada before summarizing the known output of various world producers. The article has been condensed from *Information Circular 7690* by J. D. Sargent, commodity-industry analyst, U.S. Burean of Mines.

Selenium chemically resembles sulphur and like sulphur has several allotropic forms. The lightest of the reddishbrown allotropies has a specific gravity of 4.3 and softens at 60 deg. C., while another is colloidal and fluoresces in water. Slow heating the vitreous form—made by cooling the reddish-brown allotropics quickly—to 65 deg. C. or over will convert selenium to its most common form, silvery-gray metallic selenium of which hexagonal acicular crystals are sometimes hollow and flexible, with a Moh's hardness of two and a melting point of 220.2 deg. C.

Aside from the selenium minerals themselves, magmatic sulphide deposits represent the greatest known concentration of selenium in the earth's crust. The average selenium content of magmatic sulphides is about 0.02 per cent.

#### USES AND METALLURGICAL PRODUCTION

The glass industry, traditionally the major consumer of selenium, continued to utilize a large proportion of the world's output until after the Second World War, when the selenium rectifier industry became the principal consumer. Apart from its employment in electrical industrial applications, however, selenium is used in many ways because of

its photoelectric conductivity, and is also important to the rubber industry as an accelerator and vulcanizing agent. Selenium and its compounds are widely employed in industrial and research chemistry, while in addition selenium improves the machinability of stainless steel and small quantities improve the machinability and tensile strength of copper and certain of its alloys without appreciably lowering ductility or conductivity.

Blister copper averages about 0.05 per cent selenium, but about 25 per cent of the selenium content of copper ores has been lost before the blister copper stage is reached. Blister copper is converted to refined copper by electrolysis with anode muds or slimes being a by-product of this electrolytic refining. Anode slimes contain from 4 to 25 per cent selenium, averaging about eight or nine per cent. The recovery of selenium from anode slime is different at each individual plant.

Several selenium recovery processes that have been used by companies in the United States and Canada are:

(a) Oxidizing roast: Shallow layers of slimes are heated to 500-800 deg. F. with plenty of air. Some selenium and arsenic are volatilized. The calcine is leached with H<sub>2</sub>SO<sub>4</sub>, foul electrolyte, or liberator solution, and the solution sent to the electrolytic department. Selenium is precipitated as copper selenide in the liberator system but is easily recovered.

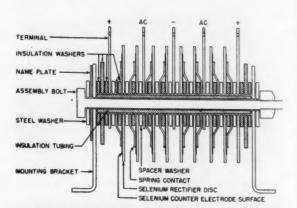
- (b) Sulphating roast: Concentrated sulphuric acid is added to the slimes prior to charging, or during the roast, by spraying. Selenium and tellurium are oxidized to the corresponding oxides or oxysulphates. Roasting at high temperature drives off selenium dioxide, but too high temperatures (over about 1,200 deg. F.) tend to decompose copper sulphate. Roasted slimes are leached with hot water. The leach liquor contains silver and some selenium and tellurium, all of which are precipitated by cementation with metallic copper or raw slimes.
- (c) Aeration in dilute H<sub>2</sub>SO<sub>4</sub>: A suspension of slimes in hot dilute H<sub>2</sub>SO<sub>4</sub> is blown with air. This dissolves metallic copper and leaves selenium and tellurium in the slimes, along with gold and silver.
- (d) Pyrometallurgical methods: Direct smelting of slimes has been virtually abandoned, as have various attempts to treat selenide matte in small converters or tank furnaces. The sodium bisulphate process recently adopted by Kennecott, however, is in this category. Soda smelting is a pyrometallurgical method, but in commercial practice the raw slimes are first decopperized by acid leaching or some other method.

Slime treatment processes are primarily designed to recover the precious metals, with selenium and tellurium recovery of secondary importance. The selenium end product of all these processes is commercial-grade selenium (97.2 to 99.94 per cent pure) usually in coke form. This coke selenium is pulverized and sold as commercial-grade selenium or further refined to high-purity selenium (99.99 + per cent).

#### GEOGRAPHIC DISTRIBUTION AND OUTPUT

Copper anodes from Rhodesian refineries assay 0.0141 per cent selenium, and their slimes assay 12.64 per cent selenium. Northern Rhodesia produced almost 30,000 lb. of selenium in 1952. Much of this selenium is recovered in Belgium and reported as Belgian production.

Selenium is produced in Australia by the Electrolytic Refining and Smelting Co. of Australia Pty., Ltd., from the company's own anode muds and from those obtained from the Mount Lyell Mining and Railway Co. Australian production of selenium is about 4,000 lb. a year from slimes containing only one or two per cent selenium. Mount Morgan, Queensland, blister copper contains 0.019 per cent selenium, but no recovery has been recorded.



Cut-away view of typical selenium rectifier assembly

Japan produces about 50,000 lb. of selenium annually, and although Soviet Union selenium statistics have not been available since 1940, judging from that country's copper production in 1953, selenium production in the Soviet Union would be about 100,000 lb. per year.

#### **EUROPEAN PRODUCERS**

In Europe, Sweden is generally the largest producer, and during 1951 Swedish selenium output was 90,000 lb. Most of this production can be attributed to Boliden Gruv AB, operating mining properties in the Skelleftea region and a smelter and electrolytic refinery at Skellefthawn.

Belgium is a significant selenium producer and exported more than 22,000 lb. in 1951, more than 37,000 lb. valued at \$616,240 to 17 foreign countries in 1952, and more than 61,000 lb. valued at \$957,080 to 15 foreign countries in 1953. Metallurgie de Hoboken, the major Belgian producer, obtains most of its selenium-bearing ores from Africa.

Western Germany produced over 16,000 lb. of selenium in 1951; the Norddeutsche Affinerie of Hamburg is the major producer. Much of its selenium raw material is imported from South America. In south-eastern Yugoslavia, the Bor Copper Mining Corporation electrolytic refinery recovers about 1,000 lb. of selenium per year. In Linate, near Milan, Italy, the Montecatini group recovers selenium from copper sulphate.

#### THE WESTERN HEMISPHERE

Mexico is a major selenium producer of North America, the majority of its selenium being recovered and refined in the United States and included in the U.S. statistics.

Selenium is produced in Canada by the International Nickel Co. at Copper Cliff, Ontario, and by Canadian Copper Refiners, Ltd., Montreal East, Quebec. The latter plant, which treats blister copper produced by Noranda Mines, Ltd., and by Hudson Bay Mining and Smelting Co. has a rated annual production capacity of 450,000 lb. of selenium, but its 1950 output was less than 350,000 lb. This decline reflects the reduction in output of selenium-rich, high-grade ores from the Horne Mines at Noranda and a larger proportion of copper obtained from other mines. The Hudson Bay blister is usually high in selenium, available analyses showing 0.18 per cent of this element. The International Nickel Co. gets most of its selenium-bearing ore from the Sudbury Basin in Ontario, which has an ore reserve containing an estimated 3,000,000 lb. of selenium. The Copper Cliff refinery has a 270,000 lb. capacity for selenium production.

The United States is the world's leading producer of selenium, with the American Smelting and Refining Co., United States Metals Refining Co., International Smelting and Refining Co., and Kennecott Copper Corporation as the principal producers. Production of selenium in the United States from 1947 to 1951 averaged 514,988 lb. annually. Apparent domestic consumption (producers' domestic shipments plus imports to consumers) of selenium has ranged during the five years from about 600,000 to over 1,000,000 lb., averaging 848,460 lb. annually.

Exports by producers were at a low level during the 1947-51 period, averaging 27,321 lb. annually, while imports of selenium from 1947 to 1951 averaged 315,568 lb. per year.

Chile ranks second only to the United States as a copper producer but apparently produces no selenium or commercial products from which selenium is recovered in substantial amounts. Many occurrences of selenium minerals are reported from Argentina, Bolivia, Chile and Honduras, although none are known to be very extensive.

# MACHINERY AND EQUIPMENT

#### Wide Use of Petrol-Driven Rock Drill

A novel petrol driven light-weight rock drill of Swedish design, called "Pionjär" (Pioneer) and manufactured by the Stockholm firm Svenska Motorborr Aktiebolaget, was put on the market three years ago and is now in use in some 40 countries all over the world. It is, for example, being employed for uranium exploration in the Beaverlodge Lake area in Canada, for roadwork in Japan and for the drilling of hard St. Gotthard granite in the Swiss Alps.

In relation to its low weight of 86 lb., the "Pionjär" has a good drilling capacity. Using Swedish cemented carbide tipped steel, it drills 400 mm.p.m. in granite of average hardness with a 27 mm. bit and 250 mm. with a 34 mm. bit. It has a guaranteed drilling depth capacity of 4 m., and the petrol consumption is only 0.11 litre per metre with a 27 mm. bit.

The "Pionjär" is driven by a 2 stroke single-cylinder petrol engine of Swedish design enclosed in a dust-proof light-metal casing. To obtain a compact and sturdy design, the crank-case, the carburettor body, the petrol tank and two fan houses have been cast in one unit. This is a type of universal tool which can be put to multiple use.

The air required for drill operation is carefully filtered and the lubrication of the rock-drill machinery is effected by means of mixing oil with the petrol, the oil consumption being only 0.009 litre per drilled metre.

#### Mobile Swing Shovel Speeds Loading and Excavating

A new machine introduced to this country by Abelson and Co. (Engineers) Ltd. is designed to speed up mechanical shovel loading and light excavating. Known as the Swing Shovel, it is



The Swing Shovel in operation

manufactured by a German engineering firm, Ahlmann-Carlshuette KG.

The main feature of the Swing Shovel is the bucket and bucket arm which, capable of slewing 180 deg. independent of the chavis, saves time manœuvring to load and dump. The loading, hoisting, slewing and unloading motions are hydraulically powered and controlled.

Power is supplied by a compact Deutz-type F.L., four-cycle air-cooled diesel engine, developing 45 h.p. at maximum governed revs. (1,600 r.p.m.). The discharge height on the AI model is 7 ft. 6 in.; 11 ft. 2 in. in the AII; and 12ft. 10 in. on the AIII.

The design of the Swing Shovel permits the bucket to be loaded at an angle to the centre line of the machine. The bucket can be slewed 90 deg. to the left or right, a unique slewing action which results in speedy loading and dumping. The machine will excavate 15 inches below wheel level. The Swing Shovel is also useful for back filling, is capable of speeds up to 12 m.p.h., and can travel on public roads under its own power.

#### A Self-Sealing Air-Hose Coupler

Instantaneous self-sealing with no leaks is claimed for a new type of air-hose coupler for mining has now been produced by Victor Products (Wallsend) Ltd. Designed for high and low pressure air-hoses, the coupler incorporates a unique rubber seal ring with a simple action. The stem of the coupler is inserted into the spud, air is turned on, and this causes the rubber ring on the stem to rock forward giving the initial sealing action. As the air pressure is increased so the complete sealing action is effected.



The self-sealing coupler, showing the spring bridle

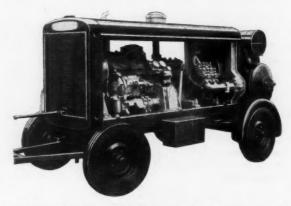
The coupler cannot be uncoupled accidentally, or deliberately while under working pressure. An additional safety factor is a special spring bridle which holds the two parts together. The range being manufactured covers hose sizes of  $\frac{1}{2}$  in.,  $\frac{1}{4}$  in., and 1 in. as hose-to-hose coupler or compressor-to-machine coupler.

#### A Portable Air Compressor

Small in size and of light weight for its capacity, the ACD 210 portable air compressor is the latest unit in this range manufactured by The Lead Wool Co. Ltd. The new model is thus economical in towing and storage as well as for manhandling on site.

The ACD 210 is a four-cylinder "V" type compressor with two H.P. and two L.P. cylinders in blocks together, an arrangement which provides for reduction in overall length as well as a convenient arrangement of air pipes. The special design of valves gives 8.3 per cent volumetric efficiency although running at 1,375 r.p.m., and the tolerances of the bearings and journals are such that no fitting is required when bearing renewals are necessary.

A preliminary notice of the ACD 210, together with a resume of other units in the manufacturers' range of compressors, appeared in our issue of November 27, 1953.



The type ACD 210 mounted on springs and pneumatic tyred road wheels

## METALS, MINERALS AND ALLOYS

COPPER.—The middle-term outlook for copper supplies continued to make rapid improvement during the past week. Agency messages say that an agreement has been reached between the International Union of Mine Mill and Smelter Workers and Anaconda which should end the 46 day old strikes at Anaconda's Montana operations; the agreement is subject to local ratification. It is also reported that a settlement has been achieved of the four week strike at Kennecott's refinery and American Smelting and Refining's smelter at Garfield, Utah; at the beginning of the week negotiations had once more broken down but the parties have apparently now accepted the services of a Government mediation board.

As soon as Kennecott's refinery is back in production it will be possible to expand ouput at Kennecott's biggest American mine in Utah which is still working only a four day week with a refined output of only about half its normal rate. Kennecott's Chino mine is on a seven day basis and there is a prospect that the Ray and Nevada mines will also work a seven day week; Kennecott's Chilean El Teniente mine is also to work seven days a week and thus boost output to 15,000 tons a month.

All this is welcome and excellent news and there is the additional prospect, now that the American strikes appear to be settled and the action could not be construed as strike breaking, that the Administration may change its mind and agree to defer purchases for the stockpile. (At the beginning of the week, the National Electrical Manufacturers Association set a telegram to the Secretary of Commerce asking for deferment of shipment to the stockpile for "the next several months.")

Welcome though the news may be it does not make it any easier to buy a lb. of copper to-day. Small deals are said to have been made in New York by hard-pressed consumers at 37 c. a lb. From Santiago it is reported that Caja Credito Minero has approved the sale of another 100 tons of blister copper to the United Kingdom at 37.4 c. a lb. In fact, there is no sign of any immediate relief from the acute spot shortage; as an example, latest Chilean production figures give an output of 339,000 tons against signed export contracts for 353,362 and domestic contracts for 25,533 tons so that future production is well mortgaged to old orders.

News has now reached London that the American owned copper companies in Chile are to join the Chilean Government in an attempt to force the American price up to somewhere near the free European level; this would mean pushing the price from 30 to, say, 35 c. a lb. It was always expected that the Chilean Government would seek a price rise; it has never shown any unwillingness to kill the goose that lays its eggs and it must recoup revenue from the smaller output. But it is extraordinary if the American companies cannot recognize the suicidal nature of the policy. It is true that 35 c. would more nearly represent the scarcity value of the metal but 30 c. itself is an adequate incentive to expand production.

Bachi and Company in one of its recent letters discusses the present copper squeeze and its effect on copper fabricators who, it states, have been lulled into a false security by the accepting of copper on a day-of-shipment price. Then, having based their own prices on copper at 30 c., they find themselves severely rationed and forced to buy odd supplies where—and if—they can at well above that level. The letter emphasizes the absence of a genuine New York market. This is very well as far as it goes, but in London the market has never operated fully to the satisfaction of consumers because of the persistent tightness of supplies and the difficulty of hedging on a market with an almost permanent backwardation. The real problem is that nobody has yet appeared willing or able to hold stocks. unsatisfactory nature of the use of the stockpile as an economic instrument could hardly have been better illustrated, for when it ought to be meeting the squeeze it is apparently prevented from doing so from political and social reasons. G.S.A. cannot be blamed for not wanting to appear a strike breaker but it is clearly not the body to hold a surplus off the market if it is not totally free to make it available when the market needs it.

Meanwhile, the strike of building workers in the Copperbelt has spread and is now affecting the supply of timber which is used as fuel for the mines. Any further disruption of supplies from this source would prolong copper consumers' difficulties just at a time when it appeared they might be lightening.

**LEAD.**—The first interpretation of the future of G.S.A. to ask for offers of lead when it asked for zinc was that the Administration now felt that at 15 c. the industry could stand on its own legs. However, last week, G.S.A. issued a separate invitation for lead. Interest in the metal remained moderate nevertheless. This was partly due to the influence of the holiday closure but also partly to the fact that the uncertainty caused by the staggered invitations was not totally dispelled. Probably the issuing of separate invitations meant no more than that there would be separate buying policies for the two metals, but there is no doubt which of the two stands in most need of support.

TIN.—Demand for tin in the United States has remained steady but quiet throughout the week.

Malayan September exports were 6,764 against 6,025 tons in August.

It is reported from La Paz by Reuter that, because of "a labour crisis" in the tin mines, the nature of which is not clear, the Bolivian Cabinet has resigned. Sr. Mario Torres Calliga has been appointed Minister of Mines and Petroleum.

A sit-down strike by 13,000 workers in the Banka mines has begun to enforce a claim for a bonus.

ZINC.—There has been a fair demand for zinc in the United States with the price of 11.50 c. very firm under the influence of continued stockpiling. It is indeed rather easier to assess stockpiling in terms of its effect on market sentiment than on the actual tonnages moved but guessers say that about 18,000 tons were involved in September and about the same this month.

ALUMINIUM.—Alcan's Kitimat smelter is to receive its first extension by the end of 1956 which will have the effect of increasing output capacity by a further 60,000 tons of ingots annually. This represents a 65 per cent increase over the present rated capacity of about 90,000 tons. When the Kitimat scheme was first planned an eventual output of around 500,000 tons was envisaged and the fact that the next stage in the expansion programme has followed so quickly on the first opening of the smelter may, perhaps, reflect the changed attitude in Washington towards the States own third round expansion programme which has always been suspect economically.

COLUMBIUM.—A Reuter report from Georgetown quotes the director of the British Guiana Geological Survey as stating that high grade deposits of columbite have been discovered in the Upper Barama river in the northwest of the Colony. He is quoted as saying that it has been proved that the mineral ran in a belt and was distributed over a wide area. This is not an isolated discovery and other areas in the Colony where columbite deposits have been identified include Morabisci, Robello, Kudabari, Upper Puruni and the mouth of the Potaro river.

NICKEL.—The recent report of the U.S. Senate Mineral Economics Sub-Committee on the "accessibility of strategic materials in time of war and of expanding economy" estimates that by 1956 nearly 10 per cent of the States' nickel requirements may be produced domestically as against the present proportion of less than 1 per cent. The report estimates U.S. nickel consumption last year at about 106,000 s.tons compared with a total western hemisphere production estimated for the current year at about 170,000 s.tons, 2,500 of which will come from the U.S.

TITANIUM.—Electro Metallurgical Company, a division of Union Carbide and Carbon Corporation, have announced plans for the production of at least 7,500 tons of titanium metal a year at a new plant costing approximately \$31,500,000, following the conclusion of a contract with the U.S. Government. Under the terms of this contract G.S.A. will purchase, at prevailing market prices, that portion of the company's output not sold to private industry for a 5 year period. The electro-

met process to be used involves sodium reduction of titanium by a method other than the Kroll process. This company has also predicted that titanium may be produced at less than a fifth of its present price through a new powder metallurgy process which has successfully completed laboratory tests involving the production of the metal from titanium scrap.

It has been revealed this week by I.C.I. that they are employing a sodium reduction process in their new titanium plant. Hitherto most production has been by the Kroll method in which titanium tetarchloride is reduced through the agency of magnesium. Some indication of the confidence which I.C.I. feel in their process may be gauged from the rapidity with which the construction of the main production plant is following on that of the pilot plant.

#### Iron and Steel

The pulse of the iron and steel industry was never more vigorous than it is to-day. The whole of the expanded capacity of the furnaces and mills is fully engaged, and yet production tends to fall short of requirements with the result that back logs are increasing. No shortage of raw materials hampers operations. Adequate supplies of ore and coke are coming forward and although the fuel situation is precarious a sufficiency of coke is available to keep the blast furnaces going at full blast.

Nevertheless, pig iron production—now running at the rate of over 12,000,000 tons per annum, is not sufficient to satisfy all

Foreign iron is being imported and the special grades required for the production of engineering castings are still scarce. Moreover, British steel makers have recently experienced difficulty in providing the largely increased tonnages of steel series in the form of billets, slabs and sheet bars which are now required in the re-rolling industry.

In this branch of the trade, the transition from slump to boom has been almost dramatic in its rapidity. During the last four weeks the volume of orders booked both from home and foreign sources has in most cases exceeded the outputs of the mills, and most of the mills cannot take on any more work for completion this year.

Deficiencies in the deliveries of sheets and plates have long been a familiar feature of the market, and similar conditions are now developing in regard to heavy joists and sections, whilst inquiries for light angles, ferro concrete bars and wire rods are much more numerous.

Australian shipments have figured prominently in the export figures in recent months, but the new import restrictions threaten to curtail business in that direction. However, inquiries from other Commonwealth sources are more numerous, encouraged no doubt by impartial preferences, and foreign trade is also expanding.

To the end of August this year's imports of foreign ores have increased by over 600,000 tons and stocks are ample but arrivals of foreign scrap have fallen off very sharply and pressure on home sources of supply have correspondingly increased.

#### The London Metal Market

(From Our Metal Exchange Correspondent)

The tin market remains quiet and featureless, and price movements have only been moderate from day to day. The undertone is quite firm and demand for consumption is maintained at a good level, particularly in the tinplate industry. Stocks of metal in official warehouses stand at a comfortable figure, and the cash and forward prices are virtually level for the time being. According to the International Tin Study Group the total stocks of tin in the form of tin in concentrates and tin metal, including affoat, for the first half of the year have declined by about one-third. On Thursday morning the Eastern price was equivalent to £742 per ton c.i.f. Europe.

Copper prices recovered sharply last Friday morning, but have since receded on the news of the settlement of the strikes at the Anaconda and Kennecott plants. Although this has eased tension at the moment, the basic position as regards supplies has not changed and there is still a good potential demand, but consumers are inclined to await developments, especially those whose requirements are assured for the near future. In the meantime Chile seems to be out of the market except occasionally for small quantities. It is thought that, with the strikes out of the way, the U.S. Government might be persuaded to reconsider their decision not to divert deliveries of copper due for the stockpile to domestic consumers on loan

Lead still has a firm undertone, although the high prices of last week have not been maintained and the backwardation remains wide. Demand here is good, particularly for metal for early delivery from points not affected by the dock strike. In America the G.S.A. has requested offers of metal to be delivered by December 15.

Zinc displays no new feature, and consumption both here and on the Continent continues to be satisfactory.

Closing prices and turnovers are given in the following

	October 7		October 14		
	Buyers	Sellers	Buyers	Sellers	
Tin					
Cash	£734	£735	£733	£734	
Three months	£7331	£734	£733	£734	
Settlement		35	£7	34	
Week's turnover		tons	320	tons	
Lead					
Current month	£110	£110}	£111	£1111	
Three months	£1041	£105	£103}	£104	
Week's turnover		tons	2,900		
Zinc	, ,,,,,,,	tomo		10113	
Current month	£83	£831	€834	£834	
Three months	€821	£83	£834	£831	
Week's turnover		tons		tons	
Copper	5,000	tons	2,500	TONS	
Cash	£285	£290	£275	£276	
Three months	£268	£270	£260	£261	
		290	£200		
Settlement					
Week's turnover	8,400	) tons	3,430	tons	

#### OTHER LONDON PRICES - OCTOBER 14

#### **ANTIMONY**

English (99%) del	ivere	1,				
10 cwt. and ove	r		 £210 per ton			
Crude (70%)			 £200 per ton			
Ore (60% basis)			 22s./24s. nom.	per	unit,	c.i.f.

#### NICKEL

.. £483 per ton 99.5% (home trade)

#### OTHER METALS

Aluminium, 99.5%, £156 per ton Bismuth (min. 2 cwt. lots) 16s. lb. Cadmium (Empire), nominal Chromium, 6s. 5d./7s. lb. Cobalt. 21s. lb.	Osmium, £50 oz. nom. Palladium, £7 oz. Platinum, £30/£31 Rhodium, £43 10s. oz. Ruthenium, £22 oz. Opidschiper, £110
Gold, 251s. 0d. f.oz.	Quicksilver, £110 ex-warehouse
Iridium, £43 oz. nom. Magnesium, 2s. 4d. lb.	Selenium, 35s. 9d. nom. per lb.
Manganese Metal (96 %-98 %) £225/£262	Silver 74 d. f.oz. spot and 73 d. f'd.
Osmiridium, £40 oz. nom.	Tellurium, 15s./16s. lb.

#### ORES ALLOYS ETC

	Oit			10, 210.
Bismuth				50% 7s. 3d. lb. c.i.f. 40% 6s. 3d. lb. c.i.f.
Chrome Or	e			7,0
Rhodesia	n Metallurg	ical (se	emi-	
		iable) 4		£12 8s. 0d. per ton c.i.f.
**	Refractor			£12 14s. 0d. per ton c.i.f.
"	Smalls 44			£8 5s. 6d. per ton c.i.f.
	ground calci			£26-£27 d/d
	Raw			£10 - £11 d/d
	e (85% basis			102s. 4d 103s. per unit c.i.f.
	nd Scheelite			190s. 0d*U.K. Gov't Stock
	22 22			d/d 190s. 0d. plus charges
Tungsten M	fetal Powder		• •	16s. 4d. nom. per lb. (home)
Ferro-tungs	ten			13s. 4d. nom. per lb. (home)
Carbide, 4-	cwt. lots			£37 6s. 3d. d/d per ton
	ganese, home			£54 15s. 0d. per ton
Manganese	Ore Indian c	i.f. Eu	rope	
(46%-48				68d./70d. per unit nom.
				2s. 93d. per lb. basis
Th 1991 1	11.1 1			0 021 11 1 1

Brass Tubes, solid drawn . .

<sup>2</sup>s. 9\(\frac{1}{3}\)d. per lb. basis 2s. 2\(\frac{1}{3}\)d. per lb. basis ex-Government stock for prompt delivery from October 15

#### THE MINING MARKETS

(By Our Stock Exchange Correspondent)

Markets started the week well particularly in the industrial sphere where steady selective demand occurred. Later, the wave of strikes began to make itself felt although prices remained remarkably stable in the circumstances.

Kaffirs did not come off so well. At the beginning of the week, prices suffered from the attraction of available capital into other markets and some liquidation of over-bought speculative positions. Later, the news of the impending resignation of Dr. Malan, together with the uncertainty regarding the future occupant of the office further depressed most of the shares.

Finance houses were erratic but, by and large, did not suffer fully the sharp declines of other sections. African and European improved due to quiet investment buying, and Consolidated Mines Selection were a notably good feature. This company is registered in the U.K. For some time past, there have been rumours concerning a possible merger scheme with another company in the Anglo American group registered in South Africa. If this were true, benefit would be received from the avoidance of heavy U.K. taxes. West Rand Investment Trust were also favourably noticed and hardened against the trend.

Individual Rand mines were mostly marked down although the chief losses here were confined to those issues where speculative buying was recently in evidence. Doornfontein and West Driefonteins were initially harder due to optimism concerning the coming quarterly reports outweighing other factors.

The Orange Free State group were naturally most affected by the turn of events. Despite favourable mention in the press, concerning the long-term outlook, St. Helena shares fell on rumours concerning a possible capital issue. It would be as well to mention here that throughout the Kaffir section the price list below does not show the full extent of the falls which occurred on Wednesday.

West African shares were again a good market and some excellent buying was reported during the week. Here again, there was a tendency to boil over on Wednesday. Favourite issues were again to the fore, notably Ashanti and Amalgamated Banket. In the latter case, the recent improved returns caused favourable comment and there are good hopes that the results may be sustained.

In the miscellaneous gold section, price changes were mixed with few significant alterations. Goldfields Rhodesian Development, however, were higher after the return of the company to the dividend list.

Diamond and platinum shares remained virtually unchanged but there was considerable public interest in coppers. The immediate squeeze in the metal price lessened but the medium and iong-term outlook appeared more settled than for some time past. Rhodesians were mostly higher despite coal and transport difficulties. Rhodesian Selection Trust improved after the final dividend of 2s. 6d. per share and Messina and Roans were other good features. Market circles suggest that recent buyers have been interested in companies with new properties now in the development stage. Esperanza went up on rumours that better news may be forthcoming from the property.

Eastern tin shares were quietly firm. Ayer Hitam, Hong Kong and Malayan Dredging were good features. In the last named case, production over the last three-quarters has been steadily rising. Nigerians shared this improvement with columbite producers leading the way. The slow progress made by the U.S. stockpile of this mineral appears to promise well for the future and possible extension of bonus scheme beyond 1956.

Lead/zincs finished the week well. Recent favourites such as Mount Isa and Consolidated Zinc were unchanged, but other issues went ahead strongly, especially the remaining Barriers.

Among miscellaneous base metal shares, South African Colliery issues and Wankie were firm.

Among Canadians, International Nickel and base metal issues were firm.

	Price	+ or -			1+ or -		Price	+ or -	Price	
INANCE	Oct. 13	on week	O.F.S.		on week	DIAMONDS & PLATINUM		on week TIN (Nigerian and	Oct. 13	
African & European	3-32	+ 32	Freddies	7/9	3d	Anglo American Inv	71	Miscellaneous) contd.		
Anglo American Corpn.	3 ½ 8 ½ 25/7 ½		Freddies Consolidated .	21/74	-4+d	Casts	27/9	Kaduna Prospectors	2/9	+3
Anglo-French	25/74	-73d	F. S. Geduld	57	- 2	Cons. Diam. of S.W.A.	61	Kaduna Syndicate	2/9	+
anglo Transvaal Consol.	28/9		Geoffries	19/9	_6d	De Beers Defd. Bearer		+ London Tin	6/44	-1
Central Mining (£1 shrs.)	48/-	+3d	Harmony	43/3	04	De Beers Pfd. Bearer.	173	— United Tin	3/-	-1
Consolidated Goldfields	58/-	1	Loraine	16/3		Pots Platinum	10/9		21-	
Consol. Mines Selection	44/41	+1/3	Lydenburg Estates	22/6			16/6	—3d		
East Rand Consols	3/6	-114	Merriespruit	12/-	-3d	Watervaal	10/0	SILVER, LEAD, ZINC		
General Mining	516	174	Middle Wits	21/-	-30	CORRER		Broken Hill South	53/9	+7
H.E. Prop. 5/- Shares	11/104	110	Middle Wits		+30	COPPER	001			1
Henderson's Transvaal.	8/14	-114	Ofsits	78/9		Chartered	88/-	-11d Burma Mines		
	51/-	+ 13u	President Brand	75/-	-1/-	Esperanza	6/3	+6d Consol. Zinc		-
ohnnies		-/2d	President Steyn	41/6	9d	Indian Copper	5/	Lake George	8/11	
Rand Mines	318	*****	St. Helena	30/-	-2/-	Messina	5-16	+ Mount Isa		-
Rand Selection	43/9	-1/3	Virginia Ord	15/9		Nchanga	114	-18 New Broken Hill	34/6	+
Jnion Corp. (2/6 units)	38/6	-3d	Welkom	31/3	+6d	Rhod. Anglo-American	83/6	-1/- North Broken Hill	68/9	+
Vereeniging Estates	47	+1	Western Holdings	51	-18	Rhod. Katanga	9/6	-6d Rhodesian Broken Hil	13/6	+10
Writs	39/41	+1/3		-	10	Rhodesian Selection	25/14	+1/41 San Francisco Mines	24/6	+
West Wits	46/-	3d				Rhokana		+1 Uruwira	4/6	+
		1	WEST AFRICAN GOLD		1	Rio Tinto			1	
			Amalgamated Banket	2/3	144d	Roan Antelope		+1/75		
RAND GOLD	1		Ariston	7/6	1414	Selection Trust	52/-	—6d MISCELLANEOUS		
Blyvoors	32/3	9d	Ashanti	24/3	1/71	Table	521-			
Brakpan	8/9	1.60	Bibiani	5/74	1 713	Tanks	5 16		49/6	-
City Deep	15/-	700	Bromana		+ /20	Tharsis Sulphur Br	6			-
Consol. Main Reef		*****	Bremang	1/101	******			Associated Manganese		
Consol. Main Reel		714	G.C. Main Reef	4/6	+60	TIN (Eastern)		Cape Asbestos		-
Crown		-/20	Konongo	3/11	+3d	Ayer Hitam	28/-	+9d C.P. Manganese	41/6	1
Daggas	68/9	-21	Lyndhurst Deep	1/41	+3d	Gopeng	8/41	+11d Consol. Murchison		-1/
Doornfontein		+1/6	Marlu	1/6		Hongkong	9/-	+101d Mashaba		
Durban Deep	31/101	+710	Taguah & Abosso	3/9	+41d	Ipoh	20/-	+3d Natal Navigation	218	
E. Daggas	12/3			8/9	+6d	Kamunting	7/74XD	+14d Rhod. Monteleo	1/3	1
E. Geduld (4/- units)	27/6	-1/-		1		Kepong Dredging	4/104	Turner & Newall	90/-	1
E. Rand Props		-3		1		Kinta Tin Mines	10/-	—3d Wankie	17/-	1 4
Geduld	3#	-	AUSTRALIAN GOLD	1		Malayan Dredging		+3d Witbank Colliery	. 41	
Govt. Areas	12/6		Boulder Perseverance	9/-		Pahang		+1+d		
Grootvlei	18/6		Gold Mines of Kalgoorlie		-34	Pengkalen		1 - 2 -		
Libanon	10/~			9/-	1 30	Petaling	7/74	+1+d CANADIAN MINES	1	
Libanon	23/9		Lake View and Star	16/-	30	Rambutan		+41d Dome	. \$304xE	2
Marievale	20/6	1.60	Mount Morgan	18/9	-30	Siamese Tin	6/104	—14d Hollinger		
Modderfontein East	16/3	100	North Kalgurli	9/3	6.4	Southern Kinta	18/9	+3d Hudson Bay Mining		**
New Kleinfontein		1/5	Sons of Gwalia	9/3			18/9	International Nickel		
New Pioneer		-1/	Western Mining	4/-		S. Malayan		Mining Corpn. of Canad		
Randfontein		-2/	western wining	12/3	+120	S. Tronoh		Mining Corpii, of Cathad	\$139	1
				1		Sungei Kinta	10/71	+11d Noranda		
Robinson Deep		60				Tekka Taiping		+41d Quemont	£75	
Rose Deep	13/-	+30	MISCELLANEOUS GOLD			Tronoh	26/6	Yukon	. 3/9	
Simmer & Jack	4/101	+30	Cam and Motor	9/44	+410					
S.A. Lands			Champion Reef	4/6	-30	TIN (Nigerian and		OIL		
Springs	3/41		Falcon Mines	7/9	30	Miscellaneous)		Anglo-Iranian		1
Stilfontein		-60	Globe & Phoenix	23/9	30	Amalgamated Tin	15/3	+6d Apex	. 32/-	
Sub Nigel		*****	G.F. Rhodesian	7/104	+440	Beralt Tin	23/3xD	+6d Attock	. 48/9	-
Van Dyk	4/3	-30	London & Rhodesian.	4/104	1 2	Bisichi	7/-	+1+d Burmah		
Venterspost		-60	Motapa	1/74	112	British Tin Inv.	17/-	+3d Canadian Eagle		1
Vlakfontein	15/6	- 01	Mysore	4/9	416	Ex-Lands Nigeria	3/3	+14d Mexican Eagle		1 -
Vlakfontein	34/9	0.	Nundydroog	4/9		Cartands Nigeria		-3d Shell (bearer)	6	-
West Driefontein	60		Quidydroog	6/-	111111		13/-	+14d Trinidad Leasehold	29/9	
W. Rand Consolidated	616	110	Ooregum	4/71		Gold & Base Metal				
W. Rand Consolidated	52/6	-1/.	St. John d'el Rey	16/-	****	Jantar Nigeria	9/71	+11d T.P.D		1
Western Reefs	45/-	-2/0	6 Zams	39/-	- 50	Jos Tin Area	14/-	+6d Ultramar	. 28/6	

#### COMPANY NEWS AND VIEWS

#### Roan, Mufulira and R.S.T.'s Final Dividend Payments

Preliminary profit statements and final dividend recommendations in respect of the financial year to June 30, 1954, have been received from Roan Antelope Copper, Mufulira Copper Mines and Rhodesian Selection Trust.

In the case of Roan Antelope, a final dividend of 2s. 6d. is to be paid on the company's isued ordinary capital of £8,987,688 in ordinary stocks and shares of 5s. each. This payment, which is subject to Rhodesia and Nyasaiand tax at 7s. 6d. in the £, follows the interim dividend of 7½d., paid after deduction of tax last July, and brings the total distribution for the year to 3s. 1½d. per share. However, due to the transfer of management and control of the company from the United Kingdom to Northern Rhodesia last year and the attendant tax complications which arose therefrom, there is no basis for a valid comparison between the year's total dividend payments and those of the previous year. Under these conditions, it is, perhaps, most relevant to consider what net payment was actually received by the U.K. shareholder. Taking this as a basis for comparison, dividends in respect of the year to June 30, 1954, were increased to 1s. 6.63d. per unit as against the previous year's total of 1s. 5.3d.

Production achieved by the company during the year showed an increase to 88,678 l.tons as against 87,307 l.tons previously. Sales, however, dropped to 84,706 l.tons as compared with 87,307 during the preceding period.

Year to June 30	Total* Profit	Tax- ation £(000)	Net† Profit	Divi- dends £(000)	To Reserve £(000)	Carry Forward £(000)
1954	9,036.6	3,308.0	4,728.6	3,932.1	801.6	93.4
1953	12,352.7	4,565.1	4,787.6	4,213.0	2,801.0	52.6

\* Before replacements and obsolescence provisions of £1,000,000 (1953—£3,000,000)
† Excluding taxation adjustment credits of £46,000 (1953—£2,165,000)

A final dividend of 2s. 6d. per share has been recommended on the isued ordinary capital of £5,293,846 in 5s. shares of Rhodesian Selection Trust. This payment, as for Roan Antelope, is subject to Rhodesia and Nyasaland tax at 7s. 6d. in the £ and together with the interim of 7½d. per share paid last July after deduction of tax brings the year's total distribution to 3s. 1½d. per share. Due, however, to the company's change of domicile and consequent tax complications which are identical to those of Roan Antelope, it is not possible as in the case of the latter company to make a logical comparison between this and last year's distribution. Nevertheless, if the net amount received by U.K. shareholders is calculated it will be seen that there has been an increase over last year's figure to a total of 1s. 6.63d. per share as against 1s. 1.2d. previously.

Year to	Total	Tax-	Net	Divi-	To	Carry
June 30	Revenue	ation	Profit	de7d	Reserve	Forward
	£(000)	£(000)	£(000)	£(000)	£(000)	£(000)
1954	2,451.0	_	3,538.9*	2,316.0	1,121.2	155.1
1953	1,805.2	Cr. 4.6	1,770.9	1,760.2	Nil	53.4

 Including £1,121,195 in respect of special interim dividend from Mufilira of 4s. 3.545d. per share free of tax which was placed to reserve (1953—Nil)

Rhodesian Selection Trust's function is to act as a public holding Company for Mufulira Copper Mines, figures in respect of which company appear below. The total proportion of Mufulira held by R.S.T. is stated to be 64.07 per cent of the issued capital.

Production of new copper by Mufulira Copper Mines during the year ended June 30, 1954, showed an increase to 87,972 as against 76,089 previously. Of this amount 84,467 l.tons was sold which compares with 72,981 l.tons in the preceding period.

Year to	Total*	Tax-	Net†	Divi-	To	Carry
June 30	Profit	ation	Profit	dends	Reserve	Forward
	£(000)	£(000)	£(000)	£(000)	£(000)	£(000)
1954	9,663.9	3,543.0	4,870.9	5,569.4	1,085.0	121.5
1953	10,467.3	3,842.0	3,625.3	2,811.1	2,785.7	125.0

\* Before replacements provision of £1,250,000 (1953—£3,000,000) † Excluding taxation adjustments of £30,000 (1953—£1,997,000)

A final dividend of 11s. per share after deduction of Rhodesia and Nyasaland tax has been recommended on the company's issued ordinary capital of £8,148,123 in shares of £1. This dividend together with the interim of 2s. 6d. per share paid last July after deduction of tax brings the total for the year to 13s. 6d., in addition however, a special distribution of 4s. 3½d. was made from reserve. Dividends paid during the preceding year amounted to 8s. 3d. of which the final payment of 5s. 3d. was free of tax.

The meetings of these companies will be held in Rhodesia on December 17. Mr. R. L. Prain is chairman of all three companies

#### Union Corporation Quarterlies—St. Helena's Good Progress

The Union Corporation group's quarterly reports for the past three months once again focus attention on the steady favourable progress made by St. Helena.

Of 12,322 ft. developed, a total of 5,695 ft. was sampled of which 67 per cent proved payable. This must be regarded as highly satisfactory as no payability figure as high as this has been achieved since the September quarter last year when the result reported exceeded that now declined by only a few feet.

Taking a stoping width of 50 in. a grade of about  $7\frac{1}{2}$  dwt. is indicated by current values of 371 in. dwt. But the cumulative average, shows that development values in respect of the current year must be running in the region of about 400 in. dwt., or an indicated grade of 8 dwt. The company's ore reserves, therefore, which at the end of last year stood at 2,000,000 tons valued at 5.3 dwt. ptr ton may soon be upgraded if the present favourable trend continues.

Even more important in regard to the potential future of the mine, are the possibilities held out by development now in progress towards its northern neighbour, Western Holdings. This together with expected high values being obtained from drilling on the President Brand border could alter considerably the present known prospects for the company.

#### Buffel's Offer to Carry Option of Two for Three at 16s.

Further details of the Buffelsfontein share offer have now been published.

An amount of £8,120,000 is required in order to bring the mine into initial production towards the end of 1956; thereafter to build up the milling rate to 100,000 tons per month; and to provide funds for the repayment of the £1,000,000 short-term loan made by the Anglo American Corporation.

The sum required is to be obtained by an issue of 4,500,000 shares of 10s. each at a price of 16s. a share which will bring in £3,600,000. Of these shares Anglo American, Strathmore Investments and Middle Wits have subscribed firm for 1,789,856 while the remaining 2,710,144 will be offered to Buffel's share-holders in proportion to their holdings. Secondly, holders of the 6,600,000 Buffel shares, which will then be in issue, will have the right to take up another 4,400,000 shares by way of two additional shares at 16s. a share for every three shares held. This right will be exercisable during the month of November, 1955, only, and in the event of undersubscription both General Mining and Anglo American have agreed either to find subscribers for excess shares or to make loans available equal to the shortfall. In this way the remaining £3,520,000 will be supplied.

Additionally, Anglo American Corporation will make available loan facilities of £1,000,000 to Buffel's if requested within six months from November 30, 1955.

#### New Free State Gold's Saaiplaas Participation

Of particular note in the report and accounts for New Free State Gold Estates for the year ended June 30, 1954, was Lt. Col. R. L. Broad's reference to the interest taken in the new company formed by New Consolidated Goldfields to work the Saaiplaas area in the Orange Free State (see Mining Journal, October 8 issue, page 403). He stated that in the event of the flotation of a new mining company taking place New Free State intended to allow its shareholders to participate directly in the subscription for the initial working capital in proportion to their shareholdings.

Although a loss of £4,289 was made by the company during the year against a previous profit of £12,006 this comparison is not strictly correct due to the lack of any income from share realizations following the decision to retain investments in Harmony for the time being. The adverse balance carried forward was accordingly increased to £128,746 as against £116,361 previously.

As at June 30, 1954, the company's investments consisted of 345,988 ordinary shares together with 51,772, six per cent convertible notes in Harmony Gold Mining and 10,000 "A" shares in Dominion Reefs (Klerksdorp). These securities which appeared on the balance sheet as at June 30 at cost of £287,098 had a market valuation at that date of £684,526—an excess over book cost of £397,428 which had increased by September 24 this year to £564,400. The company also holds rights over extensive areas in the Ventersburg district of the Orange Free State. Meeting Johannesburg, November 2. Lt. Col. R. L. Broad is chairman.

#### **Amalgamated Tin Confirm's Columbite Reserves**

Following the preliminary profit announcement published in *The Mining Journal*, September 24 issue, page 351, the full reports and accounts of Amalgamated Tin Mines of Nigeria for the year ended March 31, 1954, have now been received.

In this statement to shareholders, Mr. J. Ivan Spens, the chairman, points out that in view of the fall in the price of tin during the year together with the smaller output, profits would have been less had it not been for the increased columbite production. The average price of tin metal during the year was £657 per ton as compared with £890 per ton during the previous year while sales of columbite continued to be effected at previously negotiated prices under U.S. contacts.

Production of tin concentrates during the year fell to 4,090 tons as against 4,710 tons previously. On the other hand columbite concentrates produced rose sharply to 717 tons as compared with 576 tons in the preceding period. Moreover the company's subsidiary, Keffi Tin, considerably added to the group output of columbite with a maiden production of 190 tons produced by a pilot plant. Plans for the construction of a commercial plant of larger capacity are now in hand at this property. The company's other subsidiary London Nigerian Mines, produced nine tons of columbite. Tin output by Keffi fell to 60 tons as against 268 tons previously, reflecting the transfer of this company's tin areas to London Nigerian. Production of tin concentrates by this latter company was 271 tons.

Year to Mar. 31	Tin Sales £	Tax- ation	Net Profit*	Divi- dend £	To Reserve	Carry Forward
1954	3,629,688	926,000		471,900	75,000	267,202
1953	4,136,222	1,121,000		313,950	100,000	242,596

Including interest £30,615 (1953—£27,267) and royalty equalisation transfer £35,000 (1953—£48,000)
 Before £225,000 additional depreciation and depletion
 Note—Nigerian costs £2,041,506 (1953—£2,255,822)

In view of the company's lower net profits it might seem surprising that dividends should have been increased to 44 per cent as against 30 per cent for the previous year. It should be borne in mind, however, that this extra distribution is supported by greater earnings of the two subsidiaries whose accounts are not consolidated with the parent. Net profits made by these two companies rose sharply to £113,131 as against £35,413 in the preceding period.

Considerable prospecting has been carried out during the year for columbite deposits and last year's estimate that economically workable proved reserves amounting to 15,000 tons of primary columbite existed was confirmed. A substantial additional ton-nage of lower grade material was also indicated by further geological surveying and drilling.

#### Anglo-Ecuadorian-Record Production and Dividend Increase

A record production level of crude oil was achieved by Anglo Ecuadorian Oilfields for the year ended March 31, 1954, during which time output rose to 313,081 tons as compared with 298,476 during the previous year—an increase of 14,605 tons or approximately five per cent. The sharp increase was due, as the chairman Mr. F. C. Bowring said, entirely to oil obtained from shallow wells. There was, however, no further decline in production from the deep horizons, and output from deep wells drilled during the year was just sufficient to offset the declines from older wells. As a result of these successful operations net operating income increased by £102,900 to £1,146,957—a most satisfactory result to which the continued improvement in drilling and production techniques contributed. in drilling and production techniques contributed.

Year to Mar. 31	Total Revenue £	Tax- ation*	Net Profit £	Divi- dend £	To Reserve £	Carry Forward £
1954	1,167,510		226,025	99,000	155,095	153,443
1953	1,063,332	410,106	188,846	82,500	110,322	141,513

\* British Taxation only-Ecuadorian deducted direct from operating income

A dividend of 12 per cent has been recommended on the company's issued ordinary capital of £1,500,000 in ordinary stock as against 10 per cent last year.

On the whole deeper exploration drilling activities continue to give negative results. And in the northern area of the property where considerable exploration has taken place in the past a fresh geological survey has been commenced under the direction of a highly experienced oil geologist. It is therefore proposed to await the results of the survey before undertaking further expenditure in this area.



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NOTICE IS HEREBY GIVEN THAT THE ORDINARY GENERAL MEETINGS OF THE UNDERMENTIONED COMPANIES WILL BE HELD IN THE BOARD ROOM, SECOND FLOOR, THE CORNER HOUSE, COMMISSIONER STREET, JOHANNESBURG, AS FOLLOWS:—

Name of Company (each incorporated in the Union of South Africa)	Date of Meeting	Time	Transfer Books and Register of Members will be closed from (both days inclusive)
Harmony	Monday,	10 a.m.	9th to 15th
Gold Mining Co.	15th November		November
Limited	1954		1954
Blyvooruitzicht	Tuesday	11 a.m.	10th to 16th
Gold Mining Co.	16th November		November
Limited	1954		1954

#### GENERAL NOTE

A member entitled to attend and vote at a meeting may appoint one or more proxies to attend and vote on a poll and speak in his stead. A proxy need not be a member of the Company.

By ORDER OF THE BOARDS.

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15th October 1954.

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(Incorporated in the Union of South Africa)
Extracted from the Annual Report for the Year ended June 30, 1954

	_	Per ton milled
Working Revenue	£8,716,398 3,087,986	£7 6 1 2 11 9
Working Profit-from Gold, etc	5,628,412	£4 14 4
from Uranium (subject to adjust- ment)	753,819	
Total  Deduct Expenses less Sundry Revenue	6,382,231 46,392	
Taxation (£2,423,234) and Mineral Lease Consideration (£523,126)	6,335,839 2,946,360	
Profit after Taxation and Lease Consideration Balance unappropriated	3,389,479 1,359,814	£4,749,293
Expenditure on Trade Investments	192,262	24,147,273
Repayment on account of Capital Portion of Uranium Loan	150,830	
Dividends declared—No. 16 of 1s. 4d. and 17 of 1s. 2d. per share	3,000,000	3,343,092
Balance unappropriated at June 30, 1954		£1,406,201

The Ore Reserve was re-estimated as at June 30, 1954, as follows :

Reef	Available		Shaft and Safety Pillars			Total			
	Tons, 000's		Width, Inches	Tons, 000's	Value, Dwt.	Width, Inches	Tons, 000's	Value, Dwt.	Width, Inches
Carbon	5 176	12.3	46.5	1.513	13.0	45.7	6.689	12.5	46.3

Compared with the previous year the available reserve decreased by 339,000 tons, the value and stoping width remaining unchanged. The reserve contained in shaft and safety pillars increased by 164,000 tons resulting in a net decrease in the total reserve of 175,000 tons.

The full Report and Accounts may be obtained from the London Secretaries, A. MOIR & CO., 4, London Wall Buildings, London, E.C.2.

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#### FUTURE VIEWED WITH CONFIDENCE

The Thirty-Fourth Annual General Meeting of E. Austin & Sons (London), Limited, was held at 24 Coleman Street, E.C.2, on October 7.

Mr. James Austin, Chairman of the Company, presided.

The following is an extract from the Chairman's Statement issued with the report and acounts for the year ended March

During the year under review the Company again experienced fluctuating trading conditions on both the Textile and Metal sides of the business, and the improvements for which I had hoped last year largely failed to materialize.

As regards the cleaning materials section we have again had a steady demand for our goods. The new factory, to which I referred last year has now been purchased and part, which has been equipped with the latest machinery for washing rags, is now in operation. I hope that before the end of this year the rest of the new factory premises will be equipped for dealing with the sorting and despatch of our cleaning materials thus enabling us to increase our production to meet the demand and to operate more efficiently and economically.

On the non-ferrous metal side in the early part of the year there was a heavy fall in prices which was coupled with a slackening in the demands of consumers who were buying cautiously in anticipation of a further fall in prices. As I mentioned last year we had hoped to expand our export trade but the export of scrap metals is still virtually barred and we are constantly having to turn down export orders for our ingot metals as we are suffering from the effects of a quota system which is based on exports at a time when your company was supplying its entire output to the home market.

In view of the fact that the trading profit has fallen from £100,798 to £90,920 your Directors feel that it is advisable to recommend that the dividend be reduced from 13½ per cent to 10 per cent but at the same time to recommend a capital dividend of 2 per cent out of the capital profits. Together these proposals will give shareholders £18,750 in cash as against £18,562 last year.

Conditions since the Balance Sheet date have been reasonably satisfactory and I look to the future with confidence. I should once again like to express my appreciation to the executives and employees of the Group who have carried on most loyally throughout the year.

The report and accounts were unanimously adopted.

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#### DIVIDENDS

Amalgamated Tin Mines of Nigeria 24% (October 30) Rhodesian Corporation 2½% i (October 30) Southern Kinta Consolidated 37½% (October 30) Streamline Filters 7½% i Yukon Consolidated 6 c. (October 29) i interim

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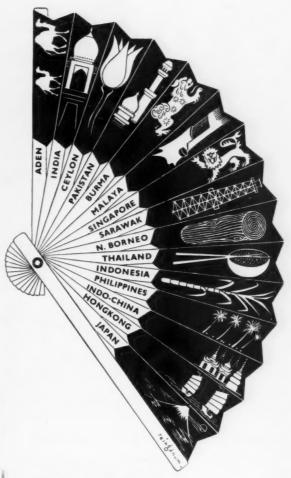
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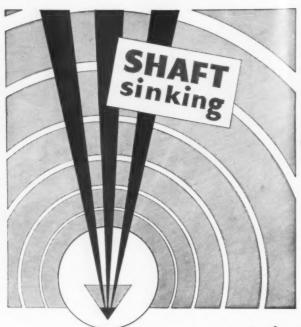
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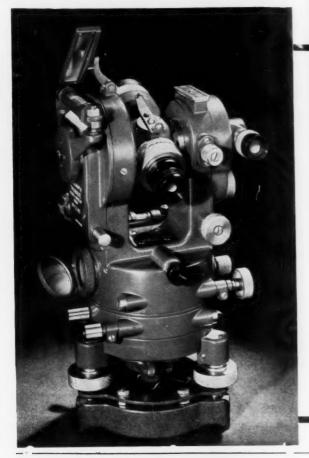
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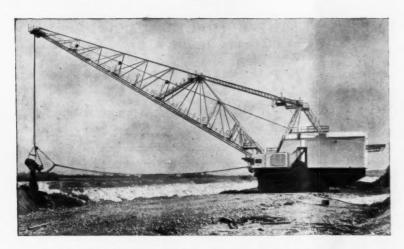
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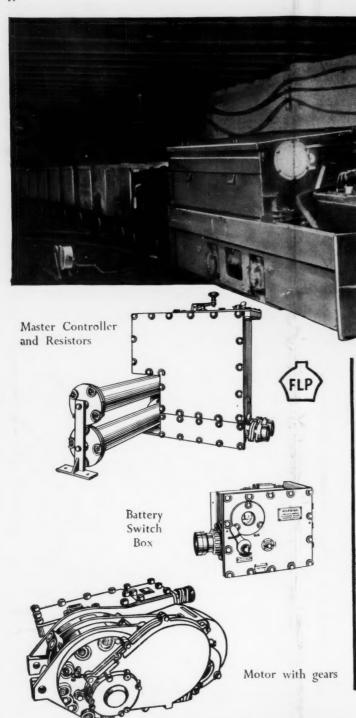
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